

What is claimed is:

- 1 1. An apparatus for storing cassettes, comprising:
2 a plurality of cassette storage shelves; and
3 a cassette mover to carry a cassette between the shelves and a docking station, the
4 cassette mover including a support member positioned in front of the shelves and movable
5 in a path adjacent to the shelves, and an end effector configured to engage the cassette, the
6 end effector movably connected to the support member.
- 1 2. The apparatus of claim 1, wherein the shelves are configured to be positioned
2 adjacent a cleanroom wall.
- 1 3. The apparatus of claim 2, wherein one or more of the shelves are positioned above
2 the docking station.
- 1 4. The apparatus of claim 1, further comprising a frame supporting the cassette
2 storage shelves and the support member.
- 1 5. The apparatus of claim 4, wherein the frame substantially fits below the docking
2 station.
- 1 6. The apparatus of claim 1, wherein a lower end of the support member is slidably
2 connected to a frame.
- 1 7. The apparatus of claim 6, wherein the end effector is joined to a first slider which
2 slidably engages a first, vertical guide joined to the support member.
- 1 8. The apparatus of claim 7, wherein the support member is joined to a second slider
2 which slidably engages a second, horizontal guide joined to the frame.
- 1 9. The apparatus of claim 8, further comprising a first lead screw engaging the first
2 slider and a first drive motor to rotate the first lead screw and drive the first slider along

3 the first guide to move the end effector vertically.

1 10. The apparatus of claim 9, further comprising a second lead screw engaging the
2 second slider and a second drive motor to rotate the second lead screw and drive the
3 second slider along the second guide to move the support member and the end effector
4 horizontally.

1 11. The apparatus of claim 1, wherein the shelves are arranged in a vertical column
2 above the docking station.

1 12. The apparatus of claim 1, wherein the end effector includes a hook-shaped finger
2 adapted to engage a bottom surface of a flange on a top of the cassette.

1 13. The apparatus of claim 1, wherein each shelf includes a plurality of pins that
2 project vertically from the shelf to engage corresponding indentations in the underside of
3 the cassette.

1 14. An apparatus for storing cassettes, comprising:
2 a plurality of cassette storage shelves positioned adjacent a wall above a plurality
3 of cassette docking stations; and
4 a cassette mover to carry a cassette between the shelves and the docking stations,
5 the cassette mover including a support member positioned in front of the shelves and
6 movable in a plane parallel to the wall, and an end effector configured to engage the
7 cassette, the end effector slidably connected to the support member.

1 15. The apparatus of claim 14, wherein the shelves are arranged in a vertical column
2 above each docking station.

1 16. The apparatus of claim 14, wherein adjacent vertical columns of shelves are
2 separated by a vertical channel, and the cassette mover is configured to transport a cassette
3 to a selected support shelf by moving the cassettes vertically through the channel to
4 position the cassette substantially adjacent and above the selected support shelf, and then

5 horizontally to position the cassette over the selected support shelf.

1 17. A semiconductor processing station, comprising:

2 a processing system to perform a fabrication step on a substrate;

3 an interface wall separating the processing system from a cleanroom;

4 a docking station located in the cleanroom to support a cassette;

5 an opening in the interface wall;

6 a wafer transfer robot to transfer the substrate through the opening between the

7 docking station and the processing system;

8 a loading platform located in the cleanroom adjacent the docking station; and

9 a cassette stocker located in the cleanroom, the cassette stocker including,

10 i) a plurality of shelves aligned in a vertical column above the docking
11 station, and

12 ii) a cassette mover to carry a cassette between the shelves, the loading
13 platform, and the docking station, the cassette mover including a support member
14 positioned in front of the shelves and movable in a path adjacent to the shelves, and an end
15 effector slidably connected to the support member and configured to engage the cassette.

1 18. A method of operating a processing station, comprising:

2 storing a plurality of cassettes on a plurality of cassette storage shelves adjacent a
3 cleanroom wall above a docking station;

4 carrying one of the cassettes to the docking station with a cassette mover;

5 removing a substrate from the cassette; and

6 returning the cassette to the cassette storage shelves with the cassette mover.